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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Notes on Weevils from Trees and Shrubs in North Dakota<sup>1</sup>

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Weevils are common tree-feeding insects in windbreaks in North Dakota. The red elm bark weevil breeds in American elm in plantings, mainly in trees of low vigor. Eight species of parasitoids, listed herein, were reared from elm wood infested with this weevil. The white pine weevil is localized in a plantation of blue spruce. The poplar-and-willow borer, an ash seed weevil, the strawberry root weevil, the sweetclover weevil, the lesser alfalfa weevil, and an acorn weevil are widespread and abundant on their respective tree hosts.

Keywords: Shelterbelt insects, Great Plains forestry, windbreaks.

A recent taxonomic study (Aarhus 1970) revealed that at least 40 species of weevils are found on trees and shrubs in North Dakota. The weevils can be a serious threat to their hosts, because larvae and adults may attack flowers, fruit, and seed, and feed in the cambium, on the foliage, and on the roots. Entomologists working on pest detection, evaluation, and control need more biological data on this important group of tree-feeding insects. The objective of the work reported here was to survey the field situation to identify the most important pests in this group.

Methods

Many plantings of trees and shrubs sheltering fields or farmsteads, as well as plantings at

Denbigh Experimental Forest, near Denbigh (McHenry County), North Dakota, were examined by the second author for weevils or damage in June, July, and August 1969. Adults were taken with a sweep net or by hand picking, and considerable infested material was held in the laboratory for emergence of adults or natural enemies.

Observations

The red elm bark weevil, Magdalis armicollis (Say), was found to be an important pest of American elm (Ulmus americana L.). In most situations the weevil is a natural pruner of lower branches. It was evident, however, that trees injured by lightning, mechanical damage, or girdling by rodents, or trees of low vigor are most likely to be attacked. Brood is produced in living branches and the main stem, sometimes down to the groundline. The larvae feed in the cambium (fig. 1) and eventually girdle and kill trees. In the laboratory, adult weevils fed on the leaves of Siberian elm (Ulmus pumila L.) as well as American elm (fig. 2), but they oviposited only on American elm. No weevils were found on Siberian elm in the field. The life history of the red elm bark weevil in North Dakota appeared to be similar to that in Wisconsin (Goeden and Norris 1963) and in New Jersey (Hoffmann 1939).

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Figure 1.—Larvae of the red elm bark weevil in mines beneath the bark of American elm.



Figure 2.—Adult red elm bark weevils and shot-hole defoliation on American elm leaves.

The red elm bark weevil was suspected by several workers to be a vector of *Ceratocystis ulmi* (Buis.) Moreau, the causal agent of Dutch elm disease. It is often reared from dead and dying elms with the well-known vectors, the smaller European elm bark beetle, *Scolytus multistriatus* (Marsham), and the native elm bark beetle, *Hylurgopinus rufipes* (Eichhoff) (Collins et al. 1936, Jones and Moses 1943, Roberts 1958). Goeden and Norris (1963) concluded that the red elm bark weevil and the black elm bark weevil, *Magdalis barbata* (Say), were not significant vectors in Wisconsin because of their feeding habits and very low degree of contamination with the fungus. The black elm bark weevil has been collected in North Dakota, but it is not as common as the red elm bark weevil. It is possible that the bark weevils might provide additional host material for the bark beetle vectors through additional weakening of elms in plantings on droughty soils or plantings suffering from lack of cultivation and other maintenance.

The following parasitoids<sup>4</sup> were reared from elm wood infested with the red elm bark weevil: Braconidae - *Eubadizon rotundiceps* (Cress.); Ichneumonidae - *Dolichomitus* sp.; Chalcidoidea - *Rhaphitelus maculatus* Walker, *Eurytoma* sp., *Eupelmella vesicularis* (Retz.), *Metapelma schwarzi* Ashm., *Trigonura ulmi* Burks, and *Euchrysia hyalinipennis* Ashm. This is a new distribution record for the last two species (Burks, personal communication).

The white pine weevil, *Pissodes strobi* (Peck) (fig. 3), was first detected in North Dakota in a 10-year-old planting of Colorado blue spruce (*Picea pungens* Engelm.) near Cavalier in Pembina County in 1962.<sup>5</sup> This

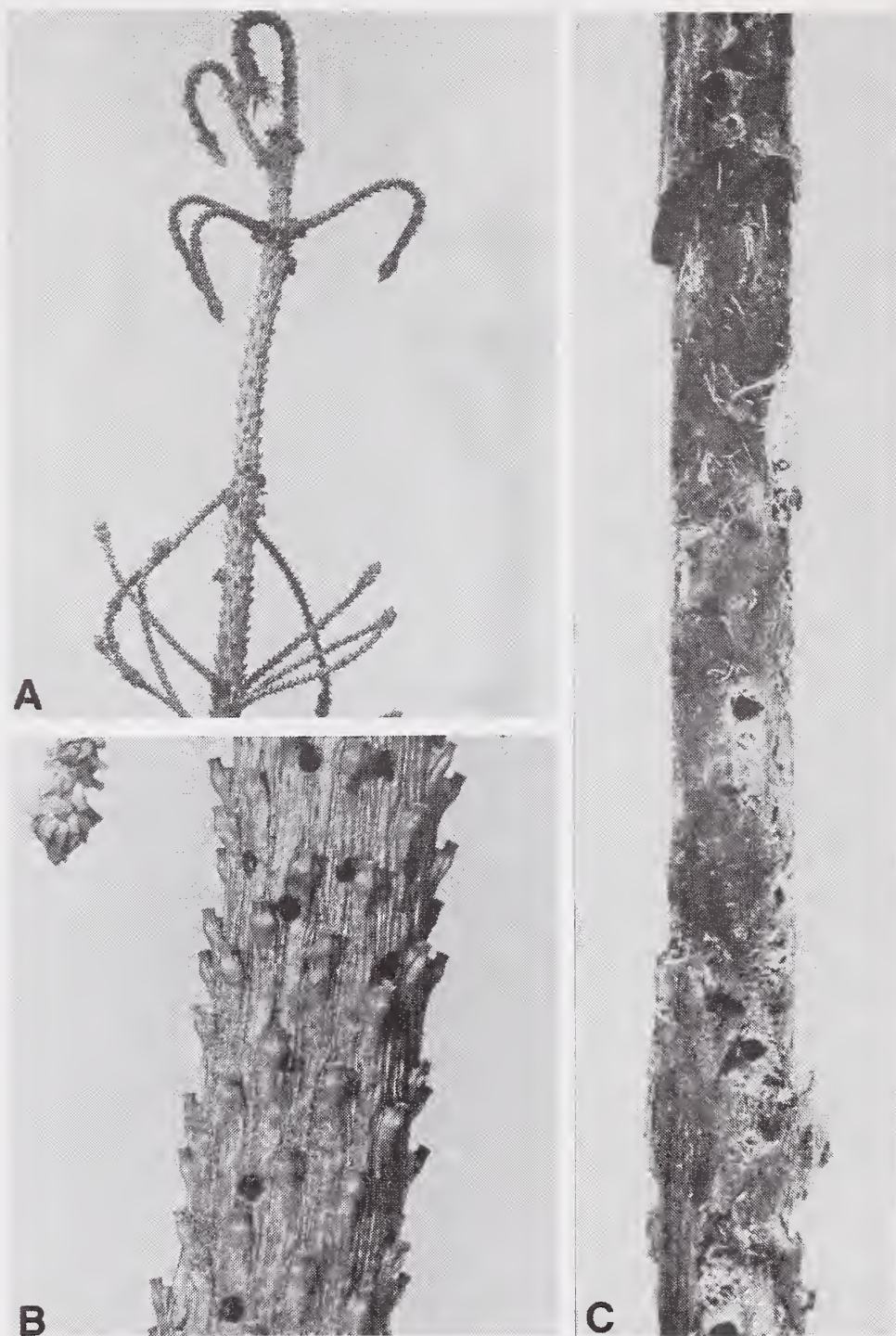
<sup>4</sup>Identification provided by Systematic Entomology Laboratory, USDA-ARS, U. S. Natl. Mus. Nat. Hist., Smithsonian Inst., Wash., D. C., as follows: Braconidae, P.M. Marsh; Ichneumonidae, R. W. Carlson; Chalcidoidea, B. D. Burks.

<sup>5</sup>Memorandum (4500) from Paul E. Slabaugh, Shelterbelt Laboratory, Bottineau, to James H. Taubman, District Forester, Walhalla, N.D., May 21, 1964.



Figure 3.—White pine weevil:

- A, dead spruce terminal;
- B, emergence holes;
- C, bark removed to expose chip cocoons beneath the emergence holes.



planting and 14 others within 5 miles were inspected in 1969. One infested leader was found at the original site, but none were found in the other plantings. Apparently a small population of the white pine weevil has sustained itself in one planting without dispersing to nearby plantings, some within 0.5 mile. This insect could be an important pest in Christmas tree plantations in the area, and the situation should be watched closely.

Adults of the poplar-and-willow borer (*Cryptorhynchus lapathi* (L.)) (fig. 4) were taken in pit traps at the base of willows (*Salix humilis* Marsh.) at Denbigh Experimental Forest throughout June and July. Last instars and

pupae were found in tunnels in willow stems on July 24. The tunnels made by feeding larvae started at the surface of the willow stem, extended in a long loop, and ended directly at the center of the stem. The stems were not girdled except at the entrance hole where frass was pushed out. Tunneling by the poplar-and-willow borer can result in wind breakage due to the weakening of the stems. The borer was not found in *Salix alba* L. which is commonly used in windbreak plantings.

An ash seed weevil, *Thysanocnemis* sp., was common on green ash (*Fraxinus pennsylvanica* Marsh.). It is a problem insect when green ash seed is scarce for tree nurseries. The strawberry





Figure 4.—Poplar-and-willow borer and damaged twig.

root weevil, Brachyrhinus ovatus (L.), is sometimes reported as a pest in tree nurseries, and it is a common household pest in North Dakota. It is polyphagous, feeding on grass roots as well as tree roots. The sweetclover weevil, Sitona cylindricollis Fahraeus, and the lesser alfalfa weevil, S. scissifrons Say, are common on Siberian pea shrub (Caragana arborescens Lamarck) (Kennedy 1968). These foliage feeders are seldom considered problems. An acorn weevil, Curculio sp., was reared from acorns, and adults were found feeding on oak leaves. Three Curculio species have been collected in North Dakota (Gibson 1969): C. sulcatulus

(Casey); C. strictus (Casey); and C. iowensis (Casey). Propagation of bur oak (Quercus macrocarpa Michx.), a desirable tree species for windbreaks in some parts of the Great Plains (Read 1958), has sometimes been hindered in tree nurseries by weevil infestation of acorns.

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